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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,554	01/23/2004	Hirokazu Honda	NEC 26485	7561

27667 7590 10/17/2005

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EXAMINER	
WILLIAMS, ALEXANDER O	
ART UNIT	**PAPER NUMBER**
2826	

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/763,554	HONDA, HIROKAZU	
	Examiner	Art Unit	
	Alexander O. Williams	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) *10-15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 16-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/23/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Serial Number: 10/763554 Attorney's Docket #: NEC 26485
Filing Date: 1/23/2004; priority to 2/3/2003 and 12/10/2003

Applicant: Honda

Examiner: Alexander Williams

Applicant's election of the species I, figures 1a, 1b, 8a-8h and 12a (claims 1-9, 16-18 and 19), filed 9/26/05, has been acknowledged.

This application contains claims 10-15 drawn to an invention non-elected without traverse.

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the **gap member** different from the first adhesive is partially arranged between the mounting substrate and the stiffener in claim 18 and the gap member is made of a low-melting alloy in claim 19 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to because figures 12f, 14a, 14b, 15a-15g, 16a-16c and 17 should be labeled "Prior Art."

Correction is required.

Claims 7, 8, 18 and 19 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 7, it is unclear and confusing to what is meant by "wherein the lid is bonded to the stiffener and a backside of the semiconductor

chip with a second adhesive." This claim fail to claim a first adhesive for there to even be a second adhesive.

In claim 18, it is unclear and confusing to what show and what is meant by "**gap member** different from the first adhesive is partially arranged between the mounting substrate and the stiffener." Where is this shown in the elected species?

In claim 19, it is unclear and confusing to what show and what is meant by "**the gap member** is made of a low-melting alloy." Where is this shown in the elected species?

Any of claims 7, 8, 18 and 19 not specifically addressed above are rejected as being dependent on one or more of the claims which have been specifically objected to above.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 to 5, 9 and 16 to 19, **insofar as claims 18 and 19 can be understood**, are rejected under 35 U.S.C. § 102(b) as being anticipated by Carden et al. (U.S. Patent # 6,224,711 B1).

1. Carden et al. (figures 1 to 4) specifically figure 4 show a semiconductor device comprising: a semiconductor chip **4** mounted on a mounting substrate **2**; a first resin **12** filling a gap between the semiconductor chip and the mounting substrate; a stiffener **8** surrounding the semiconductor chip; and a second resin **14** filling a space between the semiconductor chip and the stiffener in contact with the first resin, the first resin being different in a thermal expansion coefficient from the second resin.

2. The semiconductor device as claimed in claim 1, Carden et al. show wherein a thermal expansion coefficient of the second resin is smaller than a thermal expansion coefficient of the first resin.

3. The semiconductor device as claimed in claim 2, Carden et al. show wherein the stiffener is adhered to the mounting substrate with a resin **10** the same as the second resin **14**.

4. The semiconductor device as claimed in claim 1, Carden et al. show wherein the first resin includes an underfill part **(12 under 4)** filling the gap between the semiconductor chip and the mounting substrate, and a fillet part **(12 outside of the edge of 4)** extended from a region of the semiconductor chip.

5. The semiconductor device as claimed in claim 1, Carden et al. show wherein the stiffener is adhered to the mounting substrate with a first adhesive **10** being larger in a thermal expansion coefficient than the second resin.

9. The semiconductor device as claimed in claim 1, Carden et al. show wherein an elastic modulus of the second resin is larger than an elastic modulus of the first resin.

16. The semiconductor device as claimed in claim 1, Carden et al. show wherein the stiffener is made of a material selected from the group consisting of **Cu**, SUS, Al, alumina, silicon, aluminum nitride, and resin.

17. The semiconductor device as claimed in claim 1, Carden et al. show wherein each of the first resin and the second resin essentially contains a resin selected from a group consisting of **epoxy**, polyolefin, silicon, cyanate ester, polyimide, polynorbornene resins.

18. The semiconductor device as claimed in claim 1, Carden et al. show wherein a gap member different from the first adhesive is partially arranged between the mounting substrate and the stiffener.

19. The semiconductor device as claimed in claim 18, Carden et al. show wherein the gap member is made of a low-melting alloy.

Claims 1 to 9 and 16 to 19, **insofar as some of them can be understood**, are rejected under 35 U.S.C. § 102(e) as being anticipated by Alcoe et al. (U.S. Patent 6,740,959 B2).

1. Alcoe et al. (figures 1 to 3) specifically figure 3 show a semiconductor device comprising: a semiconductor chip **42** mounted on a mounting substrate **40**; a first resin **46** filling a gap between the semiconductor chip and the mounting substrate; a stiffener **60** surrounding the semiconductor chip; and a second resin **64** filling a space between the semiconductor chip and the stiffener in contact with the first resin, the first resin being different in a thermal expansion coefficient from the second resin.

2. The semiconductor device as claimed in claim 1, Alcoe et al. show wherein a thermal expansion coefficient of the second resin is smaller than a thermal expansion coefficient of the first resin.

3. The semiconductor device as claimed in claim 2, Alcoe et al. show wherein the stiffener is adhered to the mounting substrate with a resin the same as the second resin.

4. The semiconductor device as claimed in claim 1, Alcoe et al. show wherein the first resin includes an underfill part filling the gap between the semiconductor chip and the mounting substrate, and a fillet part extended from a region of the semiconductor chip.

5. The semiconductor device as claimed in claim 1, Alcoe et al. show wherein the stiffener is adhered to the mounting substrate with a first adhesive being larger in a thermal expansion coefficient than the second resin.

6. The semiconductor device as claimed in claim 4, Alcoe et al. show wherein the second resin **64** is in contact with inner walls of the stiffener **60**, the fillet part **46**, the mounting substrate **40** and each of side faces of the semiconductor chip **42**.

7. Alcoe et al. (figures 1 to 3) specifially figure 3 show a semiconductor device comprising: a semiconductor chip **42** mounted on a mounting substrate **40**; a first resin **46** filling a gap between the semiconductor chip and the mounting substrate; a stiffener **60** surrounding the semiconductor chip; a second resin **64** filling a space between the semiconductor chip and the stiffener in contact with the first resin, the first resin being different in a thermal expansion coefficient from the second resin; and a lid **48** for covering the stiffener and the semiconductor chip, wherein the lid is bonded to the stiffener and a backside of the semiconductor chip with a second adhesive (inherent).

8. The semiconductor device as claimed in claim 7, Alcoe et al. show wherein the second resin **64** is in contact with an inner wall of the lid.

9. The semiconductor device as claimed in claim 1, Alcoe et al. show wherein an elastic modulus of the second resin is larger than an elastic modulus of the first resin.

16. The semiconductor device as claimed in claim 1, Alcoe et al. show wherein the stiffener is made of a material selected from the group consisting of **Cu**, SUS, **Al**, alumina, silicon, aluminum nitride, and resin.

17. The semiconductor device as claimed in claim 1, Alcoe et al. show wherein each of the first resin and the second resin essentially contains a resin selected from a group consisting of epoxy, polyolefin, silicon, cyanate ester, polyimide, polynorbornene resins.

18. The semiconductor device as claimed in claim 1, Alcoe et al. show wherein a gap member different from the first adhesive is partially arranged between the mounting substrate and the stiffener.

19. The semiconductor device as claimed in claim 18, Alcoe et al. show wherein the gap member is made of a low-melting alloy.

Initially, it is noted that the 35 U.S.C. § 103 rejection based on a second resin, a stiffener and a second adhesive deals with an issue (i.e., the integration of multiple pieces into one piece or conversely, using multiple pieces in replacing a single piece) that has been previously decided by the courts.

In Howard v. Detroit Stove Works 150 U.S. 164 (1893), the Court held, "it involves no invention to cast in one piece an article which has formerly been cast in two pieces and put together...."

In In re Larson 144 USPQ 347 (CCPA 1965), the term "integral" did not define over a multi-piece structure secured as a single unit. More importantly, the court went further and

stated, "we are inclined to agree with the solicitor that the use of a one-piece construction instead of the [multi-piece] structure disclosed in Tuttle et al. would be merely a matter of obvious engineering choice" (bracketed material added). The court cited In re Fridolph for support.

In re Fridolph 135 USPQ 319 (CCPA 1962) deals with submitted affidavits relating to this issue. The underlying issue in In re Fridolph was related to the end result of making a multi-piece structure into a one-piece structure. Generally, favorable patentable weight was accorded if the one-piece structure yielded results not expected from the modification of the two-piece structure into a single piece structure.

Claims 1 to 4, 7 to 9 and 16 to 19, **insofar as some of them can be understood**, are rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson (U.S. Patent Application Publication # 2002/0140108 A1).

1. Johnson (figures 1 to 6) specifically figure 4 show a semiconductor device **10** comprising: a semiconductor chip **12** mounted on a mounting substrate **14**; a first resin **20** filling a gap between the semiconductor chip and the mounting substrate; a stiffener **26** surrounding the semiconductor chip; and a second resin **26** filling a space between the semiconductor chip and the stiffener in contact with the first resin, the first resin being different in a thermal expansion coefficient from the second resin.

2. The semiconductor device as claimed in claim 1, Johnson show wherein a thermal expansion coefficient of the second resin is smaller than a thermal expansion coefficient of the first resin.

3. The semiconductor device as claimed in claim 2, Johnson show wherein the stiffener is adhered to the mounting substrate **14** with a resin **26** the same as the second resin **26**.

4. The semiconductor device as claimed in claim 1, Johnson show wherein the first resin includes an underfill part filling the gap between the semiconductor chip and the mounting substrate, and a fillet part extended from a region of the semiconductor chip.

7. A semiconductor device comprising: a semiconductor chip mounted on a mounting substrate; a first resin filling a gap between the semiconductor chip and the mounting substrate; a stiffener surrounding the semiconductor chip; a second resin filling a space between the semiconductor chip and the stiffener in contact with the first resin, the first resin being different in a thermal expansion coefficient from the second resin; and a lid for covering the stiffener and the semiconductor chip, wherein the lid is bonded to the stiffener and a backside of the semiconductor chip with a second adhesive.

8. The semiconductor device as claimed in claim 7, Johnson show wherein the second resin is in contact with an inner wall of the lid.

9. The semiconductor device as claimed in claim 1, Johnson show wherein an elastic modulus of the second resin is larger than an elastic modulus of the first resin.

16. The semiconductor device as claimed in claim 1, Johnson show wherein the stiffener is made of a material selected from the group consisting of Cu, SUS, Al, alumina, silicon, aluminum nitride, and **resin**.

17. The semiconductor device as claimed in claim 1, Johnson show wherein each of the first resin and the second resin essentially contains a resin selected from a group consisting of epoxy, polyolefin, silicon, cyanate ester, polyimide, polynorbornene resins.

18. The semiconductor device as claimed in claim 1, Johnson show wherein a gap member different from the first adhesive is partially arranged between the mounting substrate and the stiffener.

19. The semiconductor device as claimed in claim 18, Johnson show wherein the gap member is made of a low-melting alloy.

Therefore, it would have been obvious to one of ordinary skill in the art to use the second resin, the stiffener and the second adhesive as "merely a matter of obvious engineering choice" as set forth in the above case law.

Initially, it is noted that the 35 U.S.C. § 103 rejection based on a second resin and a second adhesive deals with an issue (i.e., the integration of multiple pieces into one piece or conversely, using multiple pieces in replacing a single piece) that has been previously decided by the courts.

In Howard v. Detroit Stove Works 150 U.S. 164 (1893), the Court held, "it involves no invention to cast in one piece an article which has formerly been cast in two pieces and put together...."

In In re Larson 144 USPQ 347 (CCPA 1965), the term "integral" did not define over a multi-piece structure secured as a single unit. More importantly, the court went further and stated, "we are inclined to agree with the solicitor that the use of a one-piece construction instead of the [multi-piece] structure disclosed in Tuttle et al. would be merely a matter of obvious engineering choice" (bracketed material added). The court cited In re Fridolph for support.

In re Fridolph 135 USPQ 319 (CCPA 1962) deals with submitted affidavits relating to this issue. The underlying issue in In re Fridolph was related to the end result of making a multi-piece structure into a one-piece structure. Generally, favorable patentable weight was accorded if the one-piece structure yielded results not expected from the modification of the two-piece structure into a single piece structure.

Claims 7 and 8, **insofar as they can be understood**, are rejected under 35 U.S.C. § 103(a) as being unpatentable over Carden et al. (U.S. Patent # 6,224,711 B1).

7. Carden et al. (figures 1 to 4) specifically figure 4 show a semiconductor device comprising: a semiconductor chip **4** mounted on a mounting substrate **2**; a first resin **12** filling a gap between the semiconductor chip and the mounting substrate; a stiffener **8** surrounding the semiconductor chip; a second resin **14** filling a space between the semiconductor chip and the stiffener in contact with the first resin, the first resin being different in a thermal expansion coefficient from the second resin; and a lid **16** for covering the stiffener and the semiconductor chip, wherein the lid is bonded **(by 14)** to the

stiffener and a backside of the semiconductor chip with a second adhesive **14**.

8. The semiconductor device as claimed in claim 7, Carden et al. show wherein the second resin is in contact with an inner wall of the lid.

Therefore, it would have been obvious to one of ordinary skill in the art to use the second resin and the second adhesive as "merely a matter of obvious engineering choice" as set forth in the above case law.

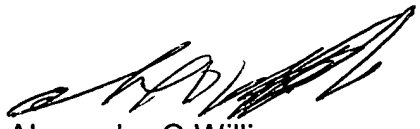
The listed references are cited as of interest to this application, but not applied at this time.

Field of Search	Date
U.S. Class and subclass: 257/778,737,738,734,787,788,789,790,795,792,793,796,704,706,707,710,712,713,717,720,698	10/13/05
Other Documentation: foreign patents and literature in 257/778,737,738,734,787,788,789,790,795,792,793,796,704,706,707,710,712,713,717,720,698	10/13/05
Electronic data base(s): U.S. Patents EAST	10/13/05

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander O. Williams whose telephone number is (571) 272 1924. The examiner can normally be reached on M-F 6:30AM-7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272 1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alexander O Williams
Primary Examiner
Art Unit 2826

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10/13/05